PHYSICS

BOOKS - NTA MOCK TESTS

NEET MOCK TEST 16

Physics

1. When both the listener and source are moving towards each other, then which of the

following is true regarding frequency and wavelength of wave observed by the observer?

A. More frequency, less wavelength

B. More frequency, more wavelength

C. Less frequency, less wavelength

D. More frequency, constant wavelength

Answer: A

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2. A charge of 8.0 mA in the emitter current brings a charge of 7.9 mA in the collector current. The values of α and β are

A. 0.99, 90

B. 0.96, 79

C. 0.97, 99

D. 0.99, 79

Answer: D

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3. The flux associated with coil changes from 1.35 Wb to 0.79 Wb within $\frac{1}{10}$s. then, the charge produced by the earth coil, if resistance of coil is 7Ω is

A. 0.08 C

B. 0.8 C

C. 0.008C

D. 8C

Answer: A

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4. A vessel containing 1 g of oxygen at a pressure of 10 atm a temperature of $47^\circ C$. It is found that because of a leak, the pressure drops to $5/8th$ of its original value and the temperature falls to $27^\circ C$. Find the volume of the vessel and the mass of oxygen that is leaked out.

A. $\frac{1}{3}g$

B. $\frac{1}{48}g$

C. $1g$

D. $\frac{2}{3}g$

Answer: A

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5. In a thermodynamic process, pressure of a fixed mass of a gas is changed in such a manner that the gas release $20J$ of heat and $8J$ of work is done on the gas. If initial internal

energy of the gas was $30J$, what will be the final internal energy?

A. 42 J

B. 18 J

C. 12 J

D. 60J

Answer: B

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6. A simple pendulum suspended from the ceiling of a trans has a time period T when the train is at rest. If the train is accelerating uniformly at a then its time period

A. increase

B. decrease

C. remain unaffected

D. become infinite

Answer: B

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7. The earth (mass $= 6 \times 10^{24} kg$) revolves round the sun with an angular velocity of $2 \times 10^{-7} \text{rad/s}$ in a circular orbit of radius $1.5 \times 10^{8} km$. The gravitational force exerted by the sun on the earth, in newtons, is

A. zero

B. 18×10^{25}

C. 27×10^{39}

D. 36×10^{21}

Answer: D

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8. The activity of a sample reduces from $A_0 \text{to} \frac{A_0}{\sqrt{3}}$ in one hour. The activity after f3 hours more will be

A. $\frac{A_0}{3\sqrt{3}}$

B. $\frac{A_0}{9}$

C. $\frac{A_0}{9\sqrt{3}}$

D. $\frac{A_0}{27}$

Answer: B

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9. From the top of a tower, a stone is thrown up and reaches the ground in time $t_1 = 9$s. a second stone is thrown down with the same speed and reaches the ground in time $t_2 = 4s$. A third stone is released from rest and reaches the ground in time t_3, which is equal to

A. 6.5 s

B. 6.0 s

C. $\frac{72}{13}s$

D. none

Answer: B

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10. A moving coil galvanometer has 150 equal divisions. Its current sensitivity is 10-divisions per milliampere and voltage sensitivity is 2

divisions per millivolt. In order that each division reads 1 volt, the resistance in ohms needed to be connected in series with the coil will be -

A. $1.25 \times 10^{-3}\Omega$

B. $12.5 \times 10^{-3}\Omega$

C. $125 \times 10^{-3}\Omega$

D. $0.125 \times 10^{-3}\Omega$

Answer: B

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11. When the angle of incidence on a material is 60°, the reflected light is completely polarised. The velocity of the refracted ray inside the materials is (in m//sec^(-1))

A. $3 \times 10^8 m/s$

B. $\frac{3}{\sqrt{2}} \times 10^8 m/s$

C. $\sqrt{3} \times 10^8$m/s

D. $\frac{1}{3} \times 10^8$m/s

Answer: C

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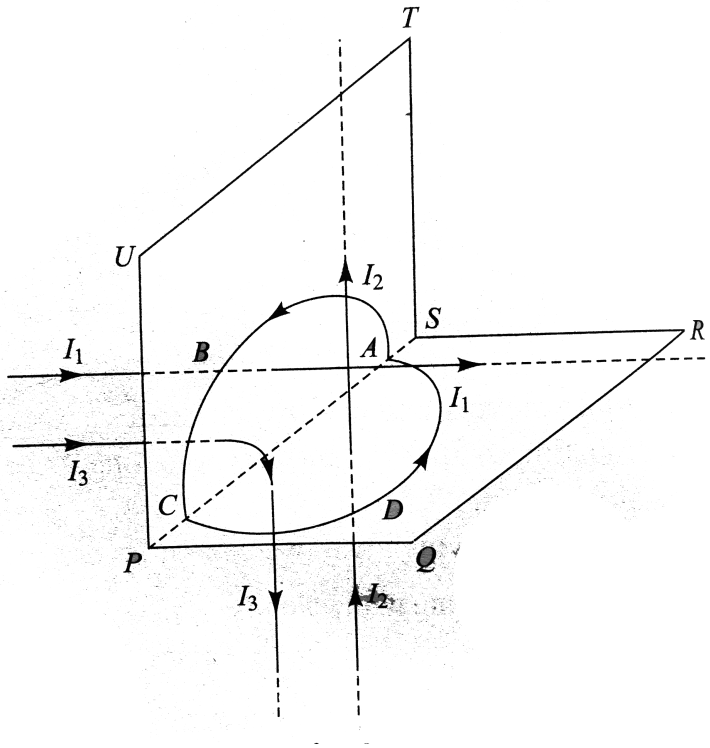
12. Figure shows an Amperian path ABCDA. Part ABC is in vertical plane PSTU while part CDA is in horizontal plane PQRS. Direction of circulation along the path is shown by an arrow near point B and at D. $\oint \vec{B} . d\vec{l}$ for this

path according to Ampere's law will be



A. $(i_1 - i_2 + i_3)\mu_0$

B. $(-i_1 + i_2)\mu_0$

C. $i_3\mu_0$

D. $(i_1 + i_2)\mu_0$

Answer: D

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13. An observer moves towards a stationary source of sound with a speed $\left(\frac{1}{5}\right)$th of the speed of sound. The wavelength and frequency of the source emitted are λ and f, respectively. The apparent frequency and wavelength recorded by the observer are, respectively.

A. 1.2f, 1.2λ

B. 1.2f, λ

C. f, 1.2λ

D. 0.8f, 0.8λ

Answer: B

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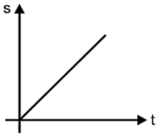
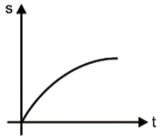
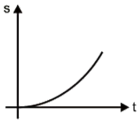
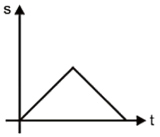
14. One stone is dropped from a tower from rest and simultaneously another stone is projected vertically upwards from the tower

with some initial velocity. The graph of distance (s) between the two stones varies with time (t) as (before either stone hits the ground).

A. 

B. 

C. 

D. 

Answer: A

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15. Focal length of two lens are f and f' and dispersive powers are ω_0 and $2\omega_0$. To form achromatic combination from these-

(1) $f' = 2f$, (2) $f' = -2f$ (3) $f' = -f/2$

A. $f' = 2f$

B. $f' = -2f$

C. $f' = f/2$

D. $f' = -f/2$

Answer: B

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16. If a $30V, 90W$ bulb is to be worked on a $120V$ line, resistance of how many ohms should be connected in series with the bulb

A. 40

B. 10

C. 20

D. 30

Answer: D

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17. Torques of equal magnitude are applied to a thin hollow cylinder and a solid sphere, both having the same mass and radius. Both of them are free to rotate about their axis of symmetry. If α_c and α_s are the angular

accelerations of the cylinder and the sphere respectively, then the ratio $\frac{\alpha_c}{\alpha_s}$ will be

A. $\frac{5}{2}$

B. $\frac{5}{4}$

C. $\frac{4}{5}$

D. $\frac{2}{5}$

Answer: C

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18. Two balls of masses m and $2m$ are attached to the ends of a light rod of length L . The rod rotates with an angular speed ω about an axis passing through the center of mass of system and perpendicular to the plane. Find the angular momentum of the system about the axis of rotation.

A. $\frac{2}{3}m\omega L^2$

B. $\frac{1}{3}\omega^2 Lm$

C. $\frac{2}{3}\omega^2 Lm$

D. $\frac{1}{3}Lm$

Answer: A

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19. Photoelectric effect supports quantum nature of light because

(a) there is a minimum frequency of light below which no photo electrons are emitted

(b) the maximum kinetic energy of photo electrons depends only on the frequency of

light and not on its intensity

(c) even when the metal surface is faintly illuminated, the photo electrons leave the surface immediately

(d) electric charge of the photo electrons is quantised

A. 1,2,3

B. 1,2,4

C. 2,3,4

D. 1,3,4

Answer: D

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20. Assuming the Sun to be a spherical body of radius R at a temperature of TK, evaluate the total radiant powered incident of Earth at a distance r from the sun

where r_0 is the radius of the Earth and σ is Stefan's constant.

A. $4\pi r_0^2 R^2 \sigma T^4 / r^2$

B. $\pi r_0^2 R^2 \sigma T^4 / r^2$

C. $r_0^2 R^2 \sigma T^4 / 4\pi r^2$

D. $R^2\sigma T^4/r^2$

Answer: B

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21. There are two identical small holes of area of cross section a on the opposite sides of a tank containing liquid of density ρ. The differences in height between the holes is h. The tank is resting on a smooth horizontal surface. The horizontal force which will have to

be applied on the tank to keep it in equilibrium is

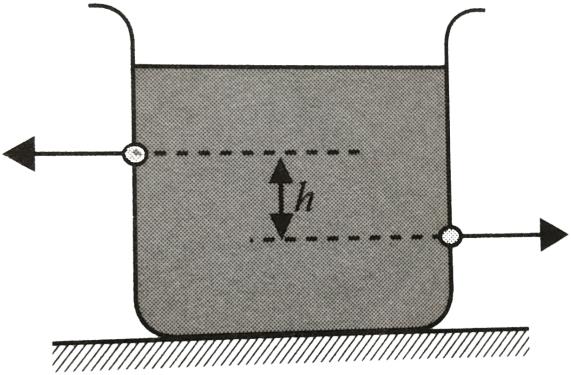

Fig. 4.184

A. ρghA

B. $2gh / \rho A$

C. $2\rho ghA$

D. $\rho gh / A$

Answer: C

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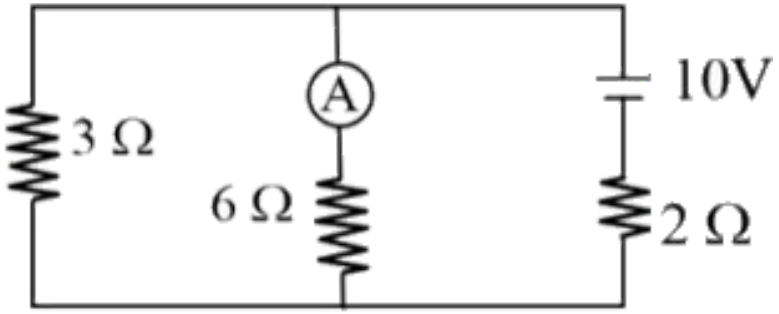
22. The reading of the ideal ammeter will be

(Resistance of ideal ammeters is zero)



A. 5/6 ampere

B. 6/5 ampere

C. 3/2 ampere

D. 2/3 ampere

Answer: A

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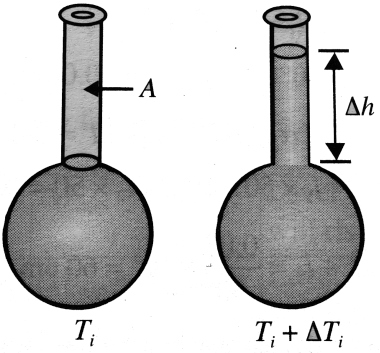

23.

A mercury thermometer is constructed as shown if Fig. 1.9. The capillary tube has a diameter of 0.004 00 cm, and the bulb has a diameter of 0.250 cm. neglecting the expansion of the glass, find the change in height of the mercury column with a temperature change of $30.0^\circ C$.

A. 3.55 cm

B. 2.60 cm

C. 4.50 cm

D. 3.33 cm

Answer: A

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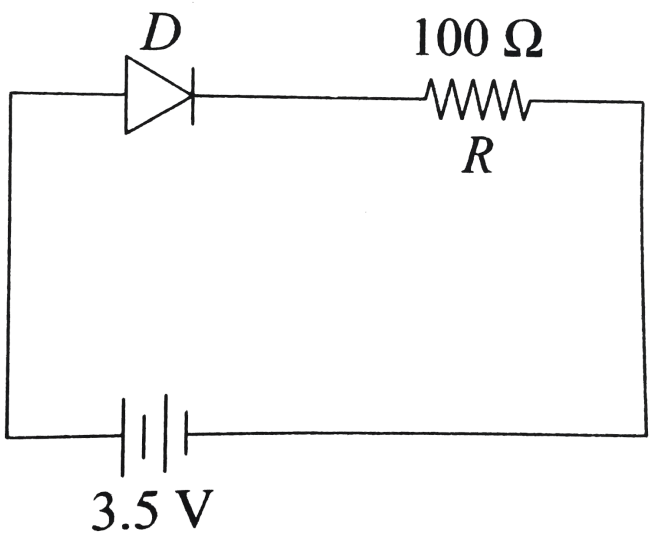
24. In the given figure, a diode D is connected to an external resistance $R = 100\Omega$ and an emf of $3.5V$. If the barrier potential developed

across the diode is $0.5V$, the current in the circuit will be :



A. 40 mA

B. 20 mA

C. 35 mA

D. 30 mA

Answer: D

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25. For a certain metal v is the five times of v_0 and the maximum velocity of coming out photons is $8 \times 10^6 m/s$. If $v = 2v_0$, then maximum velocity of photoelectrons will be

A. $4 \times 10^6 ms^{-1}$

B. $6 \times 10^6 ms^{-1}$

C. $8 \times 10^6 ms^{-1}$

D. $1 \times 10^6 ms^{-1}$

Answer: A

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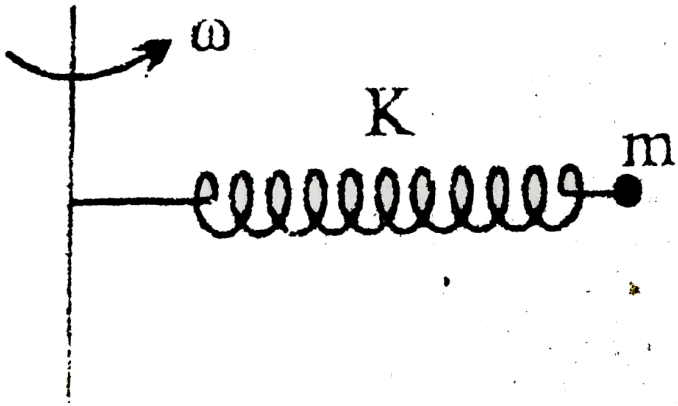
26. A particles of mass m is fixed to one end of a light spring of force constant k and unstreatched length l. the system is rotated about the other end of the spring with an angular velocity ω in gravity free space. The

increase in length of the spring is



A. $\frac{m\omega^2 l}{k}$

B. $\frac{m\omega^2 l}{k - m\omega^2}$

C. $\frac{m\omega^2 l}{k + m\omega^2}$

D. none

Answer: B

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27. A heavy uniform chain lies on a horizontal table-top. If the coefficient of friction between the chain and table surface is 0.25, then the maximum fraction of length of the chain, that can hang over one edge of the table is

A. 0.2

B. 0.25

C. 0.35

D. 0.15

Answer: A

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28. A, B, C and D are four different physical quantities having different dimensions. None of them is dimensionless. But we know that the equation $AD = C1n(BD)$ holds true. Then which of the combination is not a meaningful quantity :-

A. $\frac{C}{BD} - \frac{A^2D^2}{C}$

B. $A^2 - B^2C^2$

C. $\frac{A}{B} - C$

D. $\frac{A^2 - AC}{D}$.

Answer: D

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29. A canon shell fired breaks into two equal parts at its highest point. One part retraces the path to the canon with kinetic energy E_1

and the kinetic energy of the second part is E_2 . Relation between E_1 and E_2 is

A. $E_2 = 15E_1$

B. $E_2 = E_1$

C. $E_2 = 4E_1$

D. $E_2 = 9E_1$

Answer: D

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30. A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of $15ms^{-1}$. Then the frequency of sound that the observer hears in the echo reflected from the cliff is (Take velocity of sound in air $= 330ms^{-1}$)

A. 765 Hz

B. 800 Hz

C. 838 Hz

D. 885 Hz

Answer: C

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31. Ground state energy of H-atom is -13.6 eV. The energy needed to ionise H-atom from its second excited state is

A. 1.51 eV

B. 3.4 eV

C. 13.6 eV

D. 12.1 eV

Answer: A

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32. A wheel is subjected to uniform angular acceleration about its axis. Initially, its angular velocity is zero. In the first $2\,\text{sec}$, it rotates through an angle θ_1, in the next $2\,\text{sec}$, it rotates through an angle θ_2. The ratio of θ_2 / θ_1 is

A. θ

B. 2θ

C. 3θ

D. 4θ

Answer: C

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33. The tension in a wire is decreased by 19%

The

percentage decrease in frequency will be

A. 0.19

B. 0.1

C. 0.0019

D. none of these

Answer: B

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34. In a Young's double slit experiment, 12 fringes are observed to be formed in a certain segment of the screen when light of

wavelength $600nm$ is used. If the wavelength of light is changed to $400nm$, number of fringes observed in the same segment of the screen is given by

A. 18

B. 24

C. 30

D. 36

Answer: A

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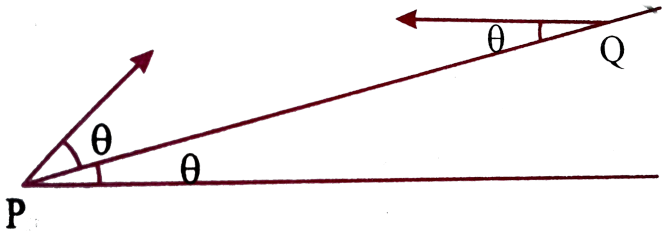
35. From an inclined palne two particles P, Q are projected with same speed at same angle θ,one up and other down the plane as shown in figure.Which of the following statement(s) is/are correct ?



A. The time of flight of each particle is the same.

B. The particles will collide the plane with same speed

C. Both the partcle strike the plane perpendicularly

D. The particles will collide in mid air iff projected simultaneously and time of flight of each particle is less than the time of collision.

Answer: A

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36. A ball is thrown vertically downwards from a height of 20m with an intial velocity v_0. It collides with the ground, loses 50% of its energy in collision and rebounds to the same height. The intial velocity v_0 is (Take, g =10 ms^{-2})

A. 20 ms^{-1}

B. 28 ms^{-1}

C. 10 ms^{-1}

D. 14 ms^{-1}

Answer: A

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37. Two men with weights in the ratio 4:3 run up a staircase in time in the ratio 12:11. The ratio of power of the first to that of second is

A. $\frac{4}{3}$

B. $\frac{12}{11}$

C. $\frac{48}{33}$

D. $\frac{11}{9}$

Answer: D

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38. The radius vector and linear momentum are respectively given by vector $2\hat{i} + 2\hat{j} + \hat{k}$ and $2\hat{i} - 2\hat{j} + \hat{k}$. Their angular momentum is

A. $2\hat{i} - 4\hat{j}$

B. $4\hat{i} - 8\hat{k}$

C. $2\hat{i} - 4\hat{j} + 2\hat{k}$

D. $4\hat{i} - 8\hat{j}$

Answer: B

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39. The magnetic field on the axis at a distance z from the centre of the bar magnet would be ?

A. In the direction of the magnetic dipole moment $\left(\overrightarrow{M}\right)$ of the bar magnet

B. In the opposite direction of the magnetic dipole moment $\left(\overrightarrow{M}\right)$ of the bar magnet

C. In the perpendicular direction of the magnetic moment $\left(\overrightarrow{M}\right)$ of the bar magnet

D. Its direction depends on the magnitude of the magnetic moment $\left(\overrightarrow{M}\right)$ of the

bar magnet

Answer: A

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40. The time period of a simple pendulum measured inside a stationary lift is found to be T . If the lift starts accelerating upwards with an acceleration $g/3$, the time period is

A. $\sqrt{2}T$

B. $\frac{T}{\sqrt{2}}$

C. $\frac{\sqrt{3}}{2}T$

D. $\frac{T}{3}$

Answer: C

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41. The diameter of the lens of a telescope is 0.61 m and the wavelength of light used is 5000 Å. The resolution power of the telescope is

A. 2×10^6

B. 10^6

C. 2×10^4

D. 2×10^2

Answer: B

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42. A vessel contains oil (density $0.9 \ \mathrm{g} \ cc^{-1}$) over mercury (density 13.6 g cc^{-1}). A homogenous sphere floates with one-third of

its volume immersed in mercury and the rest immersed in oil. The density of the material of the sphere in g cc^{-1} is-

A. 3.3

B. 6.4

C. 5.1

D. 12.8

Answer: C

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43. A refrigerator absorbs 2000 cal of heat from ice trays. If the coefficient of performance is 4, then work done by the motor is

A. 2100 J

B. 4200 J

C. 8400 J

D. 500 J

Answer: A

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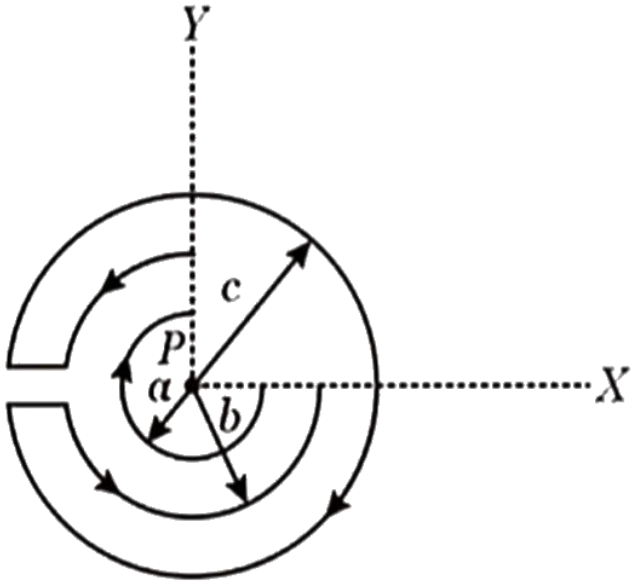
44. For $c = 2a$ and $c < b < c$, the magnetic field at the point P will be zero when-



A. a=b

B. $a = \frac{3}{5}$ b

C. $a = \frac{5}{3}b$

D. $a = \frac{1}{3}b$

Answer: C

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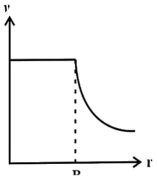
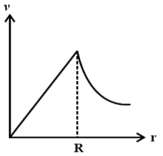
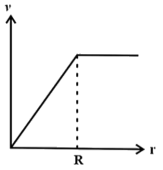
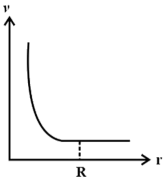
45. A spherically symmetric gravitational system of particles has a mass density $\rho = \begin{cases} \rho_0 & f \text{ or } r < R \\ 0 & f \text{ or } r > R \end{cases}$ where ρ_0 is a constant. A test mass can undergo circular motion under the influence of the gravitational field of particles. Its speed v as a

function of distahce $r(0 < r < OO)$ form the centre of the system is represented by

A. 

B. 

C. 

D. 

Answer: B

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